

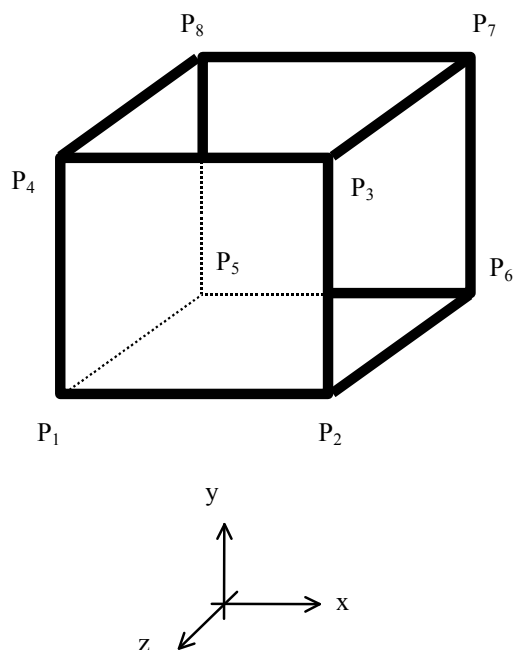
SSNV149 - Test of ENDO_ISOT_BETON

Summary:

One presents in this test two quasi static calculations of an element of volume in homogeneous deformation with the law of behavior ENDO_ISOT_BETON.

1 Problem of reference

1.1 Geometry and boundary conditions



Blocages
P1P2P3P4 : $dz=0$
P1P5P8P4 : $dx=0$
P1P5 : $dy=0$
P2P6 : $dy=0$

Traction/compression
P2P6P7P3 : dx imposé

{ dx, dy, dz } sont les déplacements des noeuds suivant les trois directions.

Figure 1.1-a: Geometry and boundary conditions of the uniaxial tests

The boundary conditions adopted ensure a homogeneous deformation in the element.

1.2 Material properties

Elastic behavior:

$$E = 300000 \text{ MPa} ; \nu = 0,3$$

Damaging behavior:

$$\sigma_Y = 3 \text{ Mpa} ; E_T = -6000 \text{ MPa}$$

2 Reference solution

This test is a test of nonregression.

3 Modeling A

3.1 Characteristics of modeling

Modeling 3D

Element MECA_HEX8.

3.2 Characteristics of the grid

Many nodes: 8

Many meshes and types: 1 HEX8

3.3 Properties of material

Damaging behavior:

$$\begin{aligned}\sigma_{seuil}^T &= 3 \text{ MPa} \\ \sigma_{seuil}^C &= 11\,225 \text{ MPa} \\ E_T &= -6000 \text{ MPa}\end{aligned}$$

3.4 Way of loading

The element is subjected to a uniaxial traction followed by a discharge and a uniaxial pressing.

3.5 Sizes tested and results

Moment	Name of the field	Component	Place	Aster
24	DEPL	<i>DX</i>	<i>N2</i>	- 8.006E+06
24	SIEF_ELGA	<i>SIXX</i>	<i>MI</i> , point 1	-2.03628E+07
24	VARI_ELGA	<i>VI</i>	<i>MI</i> , point 1	8.14067E-01

4 Modeling B

4.1 Properties of material

Damaging behavior:

$$\begin{aligned}\sigma_{seuil}^T &= 3 \text{ MPa} \\ \sigma_{seuil}^C &= 40 \text{ MPa} \\ E_T &= -6000 \text{ MPa}\end{aligned}$$

4.2 Way of loading

The element is subjected to a uniaxial pressing.

4.3 Sizes tested and results

Moment	Name of the field	Component	Place	Aster
25	DEPL	<i>DX</i>	<i>N2</i>	- 1.28E-05
25	SIEF_ELGA	<i>SIXX</i>	<i>MI</i> , point 1	-3.84E+07
25	VARI_ELGA	<i>VI</i>	<i>MI</i> , point 1	0.00E+00
27	DEPL	<i>DX</i>	<i>N2</i>	- 1.37E-05
27	SIEF_ELGA	<i>SIXX</i>	<i>MI</i> , point 1	-4.06405E+07
27	VARI_ELGA	<i>VI</i>	<i>MI</i> , point 1	2.90913 E-02
37	DEPL	<i>DX</i>	<i>N2</i>	- 1.82E-05
37	SIEF_ELGA	<i>SIXX</i>	<i>MI</i> , point 1	-4.55227E+07
37	VARI_ELGA	<i>VI</i>	<i>MI</i> , point 1	1.00E+00

5 Summary of the results

The objective of modeling A is to show the Re-closing of crack in compression after a phase of damaging traction. Modeling B shows the effects of the parameter σ_{seuil}^C (constraint threshold in an unconfined compression test). It should be noted that the constraint threshold does not correspond in calculation exactly to the constraint of initiation of the damage in compression, this is due to the fact that the criterion is evaluated starting from the deformations with the step of previous time and not with the step of current time. The error observed thus depends on the size of the steps of time.